

## ABSTRACT

A precision optical element is described, such as is used in thermal imaging systems in the infra-red, manufactured by means of single point machining, with both of its surfaces having an aspheric form, with or without the addition of a diffractive optics pattern. The element is produced while held in a novel vacuum chuck, whose support surface has a width in the radial direction significantly less than the size of the element, and which is aspherically machined to match the aspheric first surface of the element. A method whereby such an element can be produced by means of single point machining, such as diamond turning or fly cutting, is also described. Also described are new optical system designs and applications using such double-sided aspheric elements, thereby providing significant improvement over currently available optical systems.